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ABBREVIATED CONTAMINATION ASSESSMENT PLAN FOR BOCA CHICA FLYING CLUB
WITH TRANSMITTAL LETTER NAS KEY WEST FL
6/3/2004
TETRA TECH NUS



TETRA TECH NUS, INC.

AIK-04-0088

June 3, 2004

Project Number HK N2943

via email

Commander
Department of the Navy
SOUTH DIV NAVFACENGCOM
ATTN: Byas Glover (Code ES24)
P.O. Box 190010
North Charleston, South Carolina 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order No. 0351

Subject: Abbreviated Contamination Assessment Plan, Rev. 0,
Boca Chica Flying Club, Naval Air Station, Key West, Florida

Dear Mr. Glover:

I have enclosed a CD containing the PDF file for the final Abbreviated Contamination Assessment Plan, Rev. 0, Boca Chica Flying Club, Naval Air Station, Key West, Florida. The file is being distributed to the members of the NAS Key West Partnering Team via email for their convenience and to meet TtNUS's contractual obligation under CTO 0351. I am not expecting to receive any comments on this document.

Please call me at (803) 649-7963, extension 345, if you have any questions regarding the enclosed document.

Sincerely,

C. M. Bryan
Project Manager

CMB:spc

c: Ms. Debbie Wroblewski (Cover Letter Only)
Ms. T. Vaught, FDEP (Hard copy)
Mr. R. Courtright, NAS Key West

Mr. M. Perry/File
Files 2943-7.1.2

**Abbreviated Contamination
Assessment Plan
for
Boca Chica Flying Club**

**Naval Air Station
Key West, Florida**



**Southern Division
Naval Facilities Engineering Command**

Contract Number N62467-94-D-0888

Contract Task Order 0351

June 2004

**ABBREVIATED CONTAMINATION ASSESSMENT PLAN
FOR
BOCA CHICA FLYING CLUB

NAVAL AIR STATION
KEY WEST, FLORIDA**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

**Submitted to:
Southern Division
Naval Facilities Engineering Command
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North Charleston, South Carolina 29406**

**Submitted by:
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**CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0351**

JUNE 2004

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ACRONYMS/ABBREVIATIONS

AS	Air sparging
AST	Above-ground storage tank
AVGAS	Aviation gasoline
bls	Below land surface
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CLEAN	Comprehensive Long-Term Environmental Action, Navy
CTO	Contract Task Order
DOT	Department of Transportation
DPT	Direct-push technology
EDB	Ethylene dibromide
EPA	United States Environmental Protection Agency
F.A.C.	Florida Administrative Code
FC	Flying Club
FDEP	Florida Department of Environmental Protection
GCTL	Groundwater Cleanup Target Level
GS	Groundwater screening
IDW	Investigation-derived waste
KAG	Kerosene analytical group
KW	Key West
µg/L	Microgram per liter
MNA	Monitored natural attenuation
MS	Matrix spike
MSD	Matrix spike duplicate
MTBE	Methyl-tertiary butyl ether
MW	Monitoring well
NAS	Naval Air Station
NAVFAC EFD SOUTH	Department of the Navy, Naval Facilities Engineering Command, Southern Division
OVA	Organic vapor analysis
PAH	Polynuclear aromatic hydrocarbon
PPL	Priority Pollutant List

ACRONYMS/ABBREVIATIONS (CONT.)

ppm	Parts per million
QC	Quality control
RAP	Remedial Action Plan
SAR	Site Assessment Report
SB	Soil boring
SOP	Standard Operating Procedure
SVE	Soil vapor extraction
TRPH	Total recoverable petroleum hydrocarbons
TtNUS	Tetra Tech NUS, Inc.
UST	Underground storage tank
VOC	Volatile organic compound

1.0 ABBREVIATED CONTAMINATION ASSESSMENT PLAN FOR BOCA CHICA FLYING CLUB

Tetra Tech NUS, Inc. (TtNUS) has been contracted by the Department of the Navy, Naval Facilities Engineering Command, Southern Division (NAVFAC EFD SOUTH) to perform a Supplemental Site Assessment at Boca Chica Flying Club at Naval Air Station (NAS) Key West, Florida. This abbreviated Contamination Assessment Plan (CAP) was prepared under the Comprehensive Long-term Environmental Action, Navy (CLEAN) Contract Number N62467-94-D-0888, Contract Task Order (CTO) Number 0351.

1.1 SITE DESCRIPTION

The former Flying Club is located at NAS Key West along the northwest boundary of Taxiway H of Boca Chica Field (Figure 1-1). The Flying Club area includes a former motor pool refueling point that used underground storage tanks (USTs) to store gasoline. Four above-ground storage tanks (ASTs) containing aviation gasoline (AVGAS) were located approximately 50 feet south of the former motor pool refueling area. The area is currently used as an electrical repair and maintenance facility (Building A-126) and a transformer storage area (Building A-133). The site layout is shown on Figure 1-2.

1.2 SITE ASSESSMENT ACTIVITIES

A Contamination Assessment was completed in April 1994, including soil screening with an organic vapor analyzer (OVA) to detect contaminated soil. OVA screening results indicated the presence of excessively contaminated soils (greater than 50 parts per million [ppm]) in four areas. The largest of these areas measured approximately 70 feet by 40 feet and was located southeast of Building A-133. Three smaller areas of excessively contaminated soil were identified near the former AVGAS dispenser, north of Building A-133, and northwest of Building A-133 (ABB, 1994).

Groundwater samples were also collected during the Contamination Assessment and analyzed for Kerosene Analytical Group (KAG) parameters. KAG analyses consisted of volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), ethylene dibromide (EDB), total lead, and total recoverable petroleum hydrocarbons (TRPH). The Florida Department of Environmental Protection (FDEP) Class G-III aquifer cleanup goals were exceeded for VOCs and PAHs. Two areas of VOC contamination were identified, one near the former AVGAS ASTs and dispenser and the other near the former motor pool USTs. The highest total benzene concentration in a groundwater sample, 710 micrograms per liter ($\mu\text{g/L}$), was found near the former AVGAS dispenser (ABB, 1994).

Groundwater was sampled again in August 1996, as part of the Remedial Action Plan (RAP) preparation. The data indicated significant changes in the degree and extent of contamination originally defined in the Contamination Assessment Report (CAR). The highest VOC concentrations were found in samples from monitoring well FC-MW-06. Based on the 1996 sampling results, the RAP recommended the removal of 2,126 cubic yards of contaminated soil. The largest volume of soil recommended for excavation was in the vicinity of the former motor pool USTs, near Building A-133 (ABB, 1997).

In 1998, based on recommendations in the RAP, approximately 983 cubic yards of soil were removed from the Flying Club site. The amount excavated was less than scoped in the RAP because natural attenuation had reduced soil contamination since the contamination assessment was performed, and cleanup goals had been revised since production of the RAP. The ion collider process was used to treat the contaminated soil. The excavated areas at the Flying Club site were then backfilled with the treated soil (BEI, 1999).

A monitoring program presented in the RAP for the Flying Club Site was implemented in August 1999. Four of the site's monitoring wells were sampled for the KAG parameters for a period of one year. At the end of the program, only one monitoring well (FC-MW-06) had concentrations that exceeded FDEP Groundwater Cleanup Target Levels (GCTLs). Based on these results, TtNUS recommended that future monitoring at the site include only the sampling of monitoring well FC-MW-06 for an additional year (TtNUS, 2000). In August 2000, FDEP approved the recommendation but requested that monitoring well FC-MW-20 (replaced by FC-MW-22 in June 2002) be added to the sampling program as a perimeter well. The first quarterly monitoring event was conducted in October 2000.

After three quarters of monitoring, hydrocarbon levels had decreased substantially in FC-MW-06. However, naphthalene and TRPH concentrations had increased in FC-MW-20. Because concentrations of several contaminants did not decrease following several quarters of groundwater monitoring, TtNUS recommended that a treatability study be performed to investigate the efficacy of enhancing the degradation of contaminants under aerobic conditions (TtNUS, 2001).

In May 2002, an air sparging (AS)/soil vapor extraction (SVE) Treatability Study was initiated at the site to remediate residual hydrocarbon contaminants in the soil and groundwater. The remedial system operated effectively from June 2002 through January 2003, with the exception of a one-week period when the system was down for equipment repair. TtNUS performed routine operation and maintenance during monthly site visits. The trailer containing the AS/SVE system was removed in February 2003 after completion of the treatability study. Quarterly groundwater samples were collected during operation of the AS/SVE system, in September 2002 and January 2003. The AS/SVE Treatability Study Evaluation Report concluded that the overall KAG contamination in the previously-defined source water monitoring

well (FC-MW-06) had decreased since implementation of the AS/SVE system. However, groundwater from the perimeter well, FC-MW-22 (which replaced FC-MW-20 due to damage), showed an increase in concentrations of VOCs, PAHs, and lead following the treatability study (TtNUS, 2003). The Flying Club MNA Report for February 2004 recommended that a Supplemental Site Assessment be performed following one additional groundwater monitoring event scheduled to take place in late May 2004 (TtNUS, 2004).

1.3 SCOPE OF WORK

1.3.1 Supplemental Site Assessment

A Supplemental Site Assessment will be conducted at the Flying Club to better delineate soil and groundwater contamination at the site. The investigation will include a direct-push technology (DPT) assessment. Approximately 50 soil borings will be installed on a 20-foot grid and advanced to the water table to an approximate depth of four feet below land surface (bls). Figure 1-3 shows the proposed DPT boring locations. Soil Borings will be labeled numerically as installed, starting with FC-SB-01. Soil from the vadose zone will be screened using an OVA for each 2-foot vertical interval at all soil borings. An OVA reading greater than 50 parts per million (ppm) will be considered "excessively contaminated soil," as defined in Chapter 62-770.200 of the Florida Administrative Code (F.A.C.). For each general area where "excessively contaminated soil" is identified, three soil samples will be collected for fixed-base laboratory analyses, to include benzene, toluene, ethylbenzene, and total xylenes (collectively known as BTEX), methyl-tertiary butyl ether (MTBE), PAHs, and TRPH. The three samples will be collected from soil borings that exhibit low, medium, and high OVA responses for that specific area. In addition, groundwater screening samples will be collected from approximately one third of the soil borings. Borings where groundwater screening samples are collected will be determined in the field based on elevated OVA readings and any visible contamination. Groundwater screening samples will be analyzed at a fixed-base laboratory for Priority Pollutant List (PPL) VOCs, including BTEX and MTBE, PAHs, and lead.

Three shallow (15 feet deep) monitoring wells, to be labeled FC-MW-23, -24, and -25, will be installed to delineate any groundwater contamination. Locations of the monitoring wells will be determined by soil and groundwater screening analytical results. Monitoring wells will be surveyed by a Florida-licensed surveyor following installation. Groundwater samples will be collected quarterly from the Flying Club beginning in August 2003. Groundwater samples from the three existing monitoring wells (FC-MW-05, -06, and -22) will be collected during the first quarterly event. Subsequent quarterly events will include the three existing monitoring wells as well as the three newly installed wells. All groundwater samples will be analyzed for the KAG. Table 1-1 summarizes soil and groundwater samples and analyses for the Flying Club Supplemental Site Assessment. Groundwater sampling activities, including quality

assurance/quality control, and field documentation will be performed at each site following FDEP Standard Operating Procedures (SOPs) and TtNUS's Florida Regional Quality Assurance Program Manual (TtNUS, 2002). Low-flow sampling techniques and gravity flow will be used for groundwater sample collection.

The scope of the contamination assessment will also include a tidal influence study. A minimum of three wells will be used to assess the degree to which tides influence water levels in the monitoring wells. Static water levels in the wells will be measured at 15-minute intervals over a 48-hour period using an electronic data logger. The study will be conducted as close as possible to a full moon to assess the maximum possible tidal effect.

1.4 SAMPLE IDENTIFICATION

The base designation for NAS Key West is KW. The site designation for the Flying Club is FC. The sample tracking number will consist of a five- to six-segment, alphanumeric code that identifies the Site designation, location, depth, month and year of sample event, and the Quality Control (QC) designation. The depth and QC designations will only be used if applicable. Any other pertinent information regarding sample identification will be recorded in the field logbook.

The alphanumeric coding to be used in the sample system and examples of possible sample identification numbers follow:

AA	-	Base Designation
AA	-	Site Designation
AANN	-	Location
NN	-	Depth range in feet (if applicable)
NNNN	-	Month and Year
AAA	-	QC Designation (if applicable)

Character Type:

A = Alpha

N = Numeric

Location:

GS = Groundwater Screening

MW = Monitoring Well

SB = Soil Boring

Example 1: A soil sample collected from soil boring SB-01 at the Flying Club, at a depth of 0-2 feet, during the June 2004 sampling event would be called KWFCSB01-02-0604. The groundwater screening sample collected from soil boring SB-20 at the Flying Club during the June 2004 sampling event would be called KWFCGS-20-0604.

Example 2: The fixed base analytical groundwater sample, matrix spike (MS), and matrix spike duplicate (MSD) collected from monitoring well MW-05 at the Flying Club during the November 2004 sampling event would be called KWFCMW-05-1104, KWFCMW-05-1104MS, KWFCMW-05-1104MSD.

Trip, rinsate, and field blanks will be identified by base designation, type of blank, and the date of collection. For example, a trip blank collected on November 4, 2004 would be called KWTB110404.

1.4.1 IDW Handling

Development water, purge water, decontamination water, and soil cuttings from the installation of monitoring wells will be managed as investigation-derived waste (IDW) and containerized in Department of Transportation (DOT) approved 55-gallon drums. All drums will be labeled, at a minimum, with the following: contents, date, source and NAS Key West generator number (FL 6170022952). All IDW will be handled in accordance with the United States Environmental Protection Agency (EPA) guidance document "Management of Investigation-Derived Wastes during Site Inspections" (EPA, 1991).

Following receipt of initial groundwater sample results from the new monitoring wells, TtNUS personnel will dispose of IDW. Additional groundwater sampling events may not require containerization of IDW if initial sample results indicate that the groundwater is nonhazardous waste. In this case, groundwater will be returned to ground in the immediate area of the monitoring well that produced it.

1.4.2 QC Samples

QC samples will be collected as specified in the FDEP SOP FQ1000 – Field Quality Control Requirements (FDEP, 2002). A trip blank will be included in all shipments containing samples for volatile analysis. MS/MSD samples will be collected at the rate of one per 20 samples per matrix. Equipment blanks and field blanks will also be collected at a minimum of 5% of each reported test result/matrix combination. Duplicate samples will be collected at a rate of one per 10 samples per matrix.

1.5 REPORTING

Results from the first three groundwater sampling events will be reported in quarterly groundwater monitoring reports. Following the fourth quarter sampling event, a Supplemental Site Assessment Report (SAR) will be prepared evaluating all soil and groundwater data collected during the investigation. The report will identify the horizontal and vertical extent of contamination and any free-phase product discovered. The report will also include confirmation of the contaminant source and geologic and hydrologic conditions at the site that may affect contaminant transport, the rate and direction of groundwater flow, classification of aquifers beneath the site, location of confining beds, if any, beneath the contamination zone, location of closest potable water wells, if any, and potential to contaminate these wells. Results from the tidal influence study performed at the site will also be presented in the Supplemental SAR. The Supplemental SAR will recommend an appropriate remedy for the site based on the investigation results. For example, if monitored natural attenuation (MNA) is the selected remedy for the site, the Supplemental SAR will include detailed recommendations such as the number of wells to be sampled, analyses scoped for the samples, and frequency of sampling events. The Supplemental SAR will be prepared in draft and final forms. After the state's review of the final Supplemental SAR, TtNUS will prepare an addendum (if necessary) to incorporate any comments received.

TABLE 1-1
PARAMETER GROUPS AND MEDIA OF INTEREST
FOR FIXED-BASED LABORATORY ANALYSIS
BOCA CHICA FLYING CLUB
NAVAL AIR STATION
KEY WEST, FLORIDA

Media Samples	PPL VOCs (including BTEX and MTBE)	BTEX and MTBE	PAHs	TRPH	EDB	Lead
DPT INVESTIGATION						
Soil		X	X	X		
Groundwater Screening	X		X			X
GROUNDWATER SAMPLING EVENT 1 (3 wells)						
Groundwater	X		X	X	X	X
GROUNDWATER SAMPLING EVENT 2 (6 wells)						
Groundwater	X		X	X	X	X
GROUNDWATER SAMPLING EVENT 3 (6 wells)						
Groundwater	X		X	X	X	X
GROUNDWATER SAMPLING EVENT 4 (6 wells)						
Groundwater	X		X	X	X	X

BTEX, MTBE, and PPL VOC – Method SW-846 8260B

PAH – Method SW-846 8270C, 8310, or 8270C SIM

EDB – Method EPA 504.1

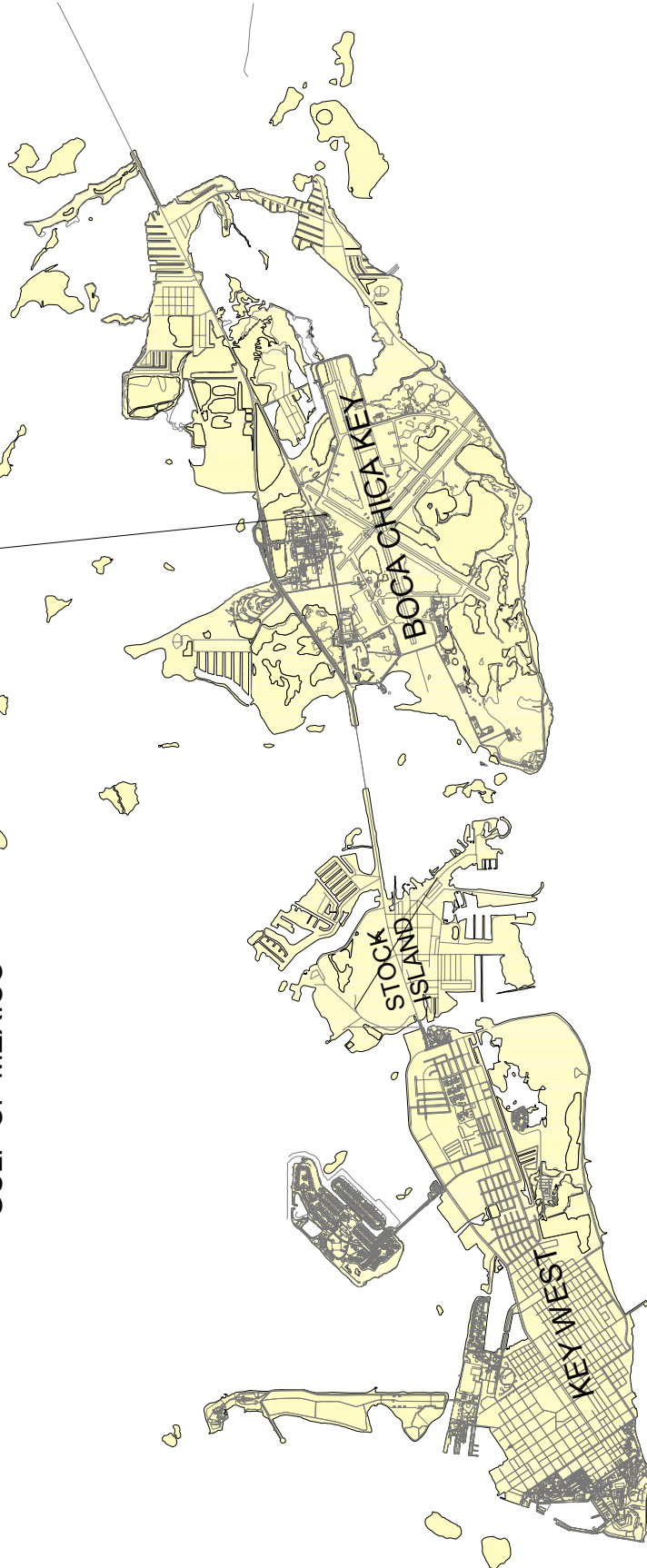
TRPH – Method FL-PRO

Lead – Method SW-846 6010B



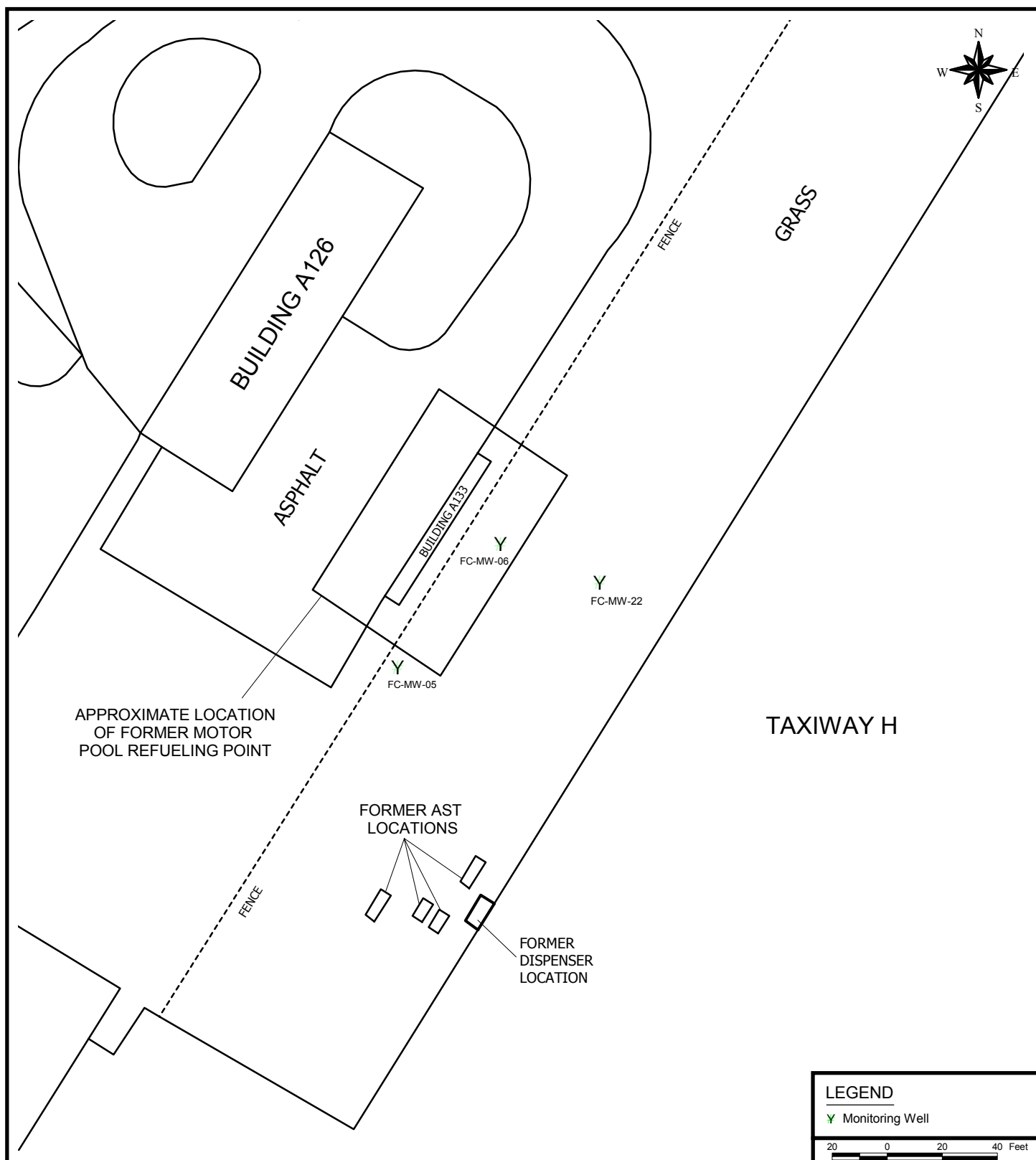
BOCA CHICA
FLYING CLUB

GULF OF MEXICO



ATLANTIC OCEAN


NO.		DATE		REVISIONS		DRAWN BY		DATE		AIR STATION		ABBREVIATED CAP FOR	
						EHM		05/07/2004		NAVAL AIR STATION		BOCA CHICA FLYING CLUB	
						PC		05/09/2004		KEY WEST, FLORIDA		LOCATION MAP	
						COST/ISSUED-AREA						NAVAL AIR STATION	
												KEY WEST, FLORIDA	
												FIGURE NO.	
												1-1	
												APPROVED BY	
												CMB	
												DATE	
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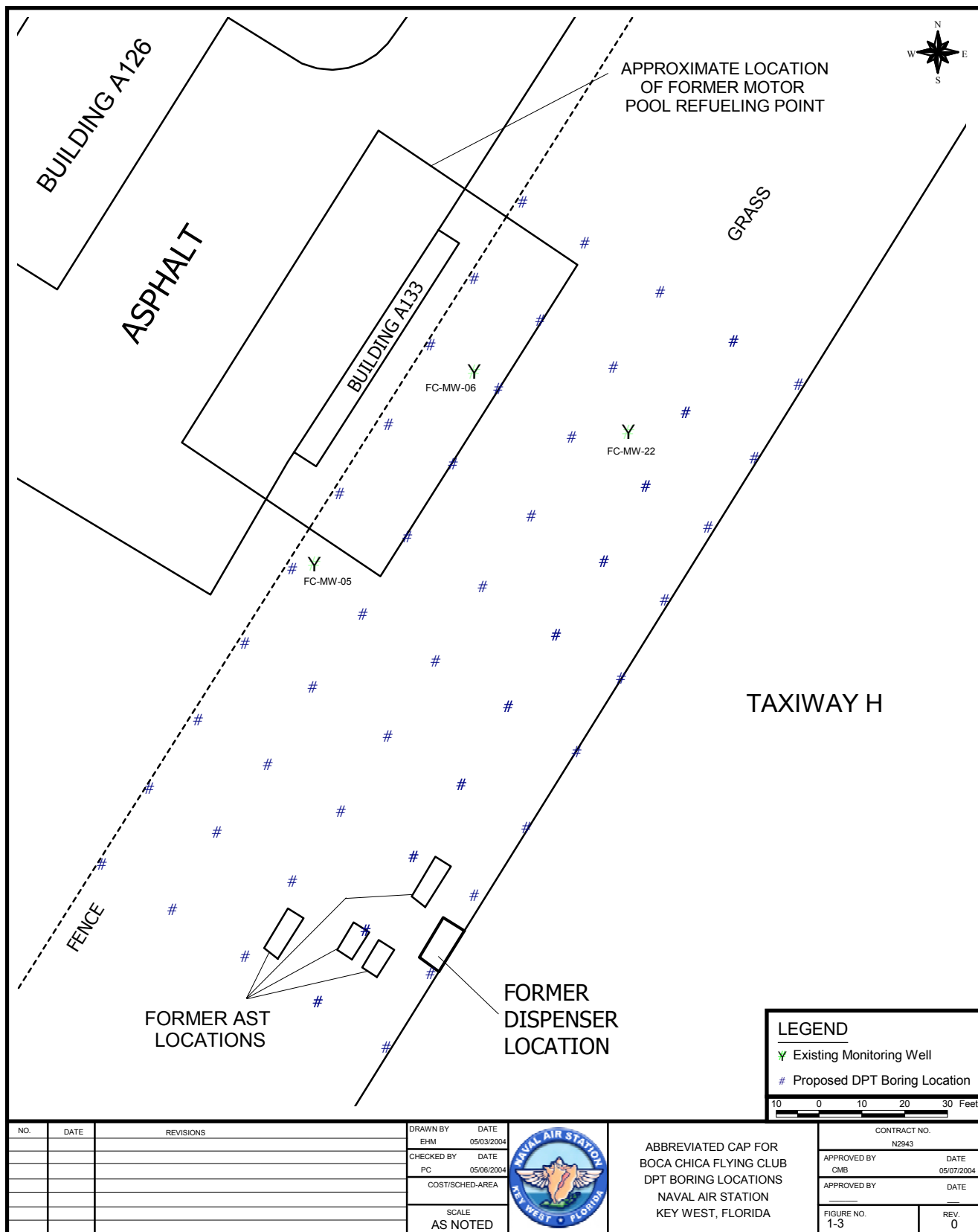
LEGEND

Y Monitoring Well

20 0 20 40 Feet

NO.	DATE	REVISIONS	DRAWN BY	DATE		ABBREVIATED CAP FOR BOCA CHICA FLYING CLUB SITE MAP NAVAL AIR STATION KEY WEST, FLORIDA	CONTRACT NO. 2943	
			EHM	05/03/2004			APPROVED BY	DATE
			PC	05/06/2004			CMB	05/07/2004
							APPROVED BY	DATE
							FIGURE NO. 1-2	REV. 0

K:\FLYINGCLUB CAP.APR LAYOUT: FIGURE 1-2 SITE MAP BY: EHM 05/03/2004



K:/FLYINGCLUB CAP.APR LAYOUT: FIGURE 1-3 DPT BORING LOCATIONS BY: EHM 05/03/2004

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